



City of Nashua  
Division of Public Works

# Wastewater Capital Projects

- Combined Sewer Overflow (CSO)
  - Collection Systems
- Wastewater Treatment Facility

# Nashua Wastewater System

## CSO Systems

- CSO Outfalls – 9
  - 4 Nashua River
  - 5 Merrimack River
- Storage Tank at CSO 4
- Sluice Gate at CSO 6

## Collection Systems

Combined Sewers (in inner city) - 100 miles

Separate Sanitary Sewers -190 miles

Sewage Pump Stations – 13

Separate Storm Drains -130 miles

Catch Basins and Manholes - 19,500

Stormwater Detention Ponds – 35

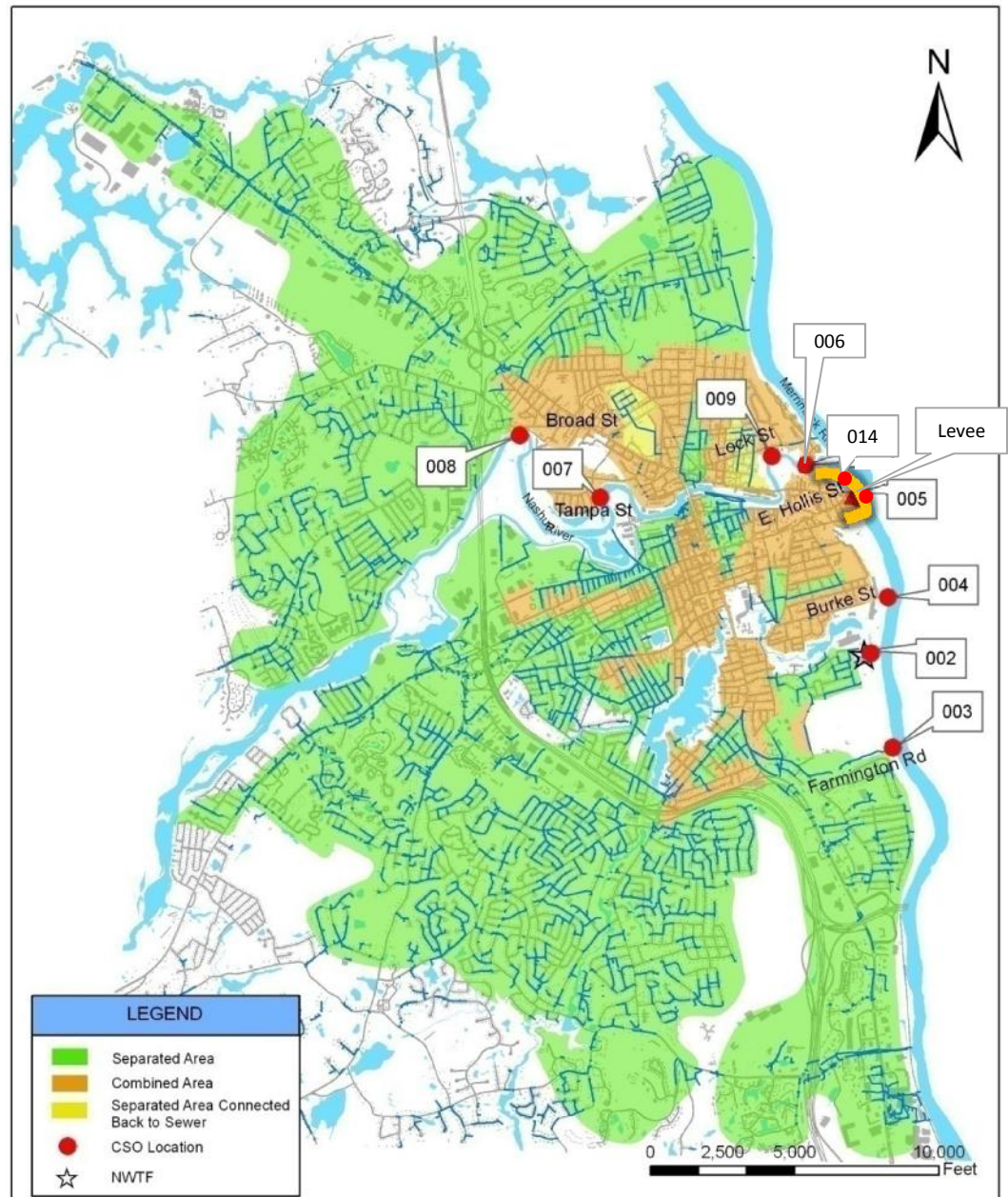
Stormwater Green Infrastructure

Merrimack River Flood Control (levee,  
CSO pump station, overflow basin, slide gate)

## Wastewater Treatment Facility

Wastewater Facility

- Ave Dry Weather Flow -  
11 Million Gal/Day (MGD)
- Wet Weather Capacity - 50 MGD
- Wet Weather Flow (CSO) Treatment Facility -  
60 MGD capacity
- Screening and Disinfection Facility  
91MGD capacity



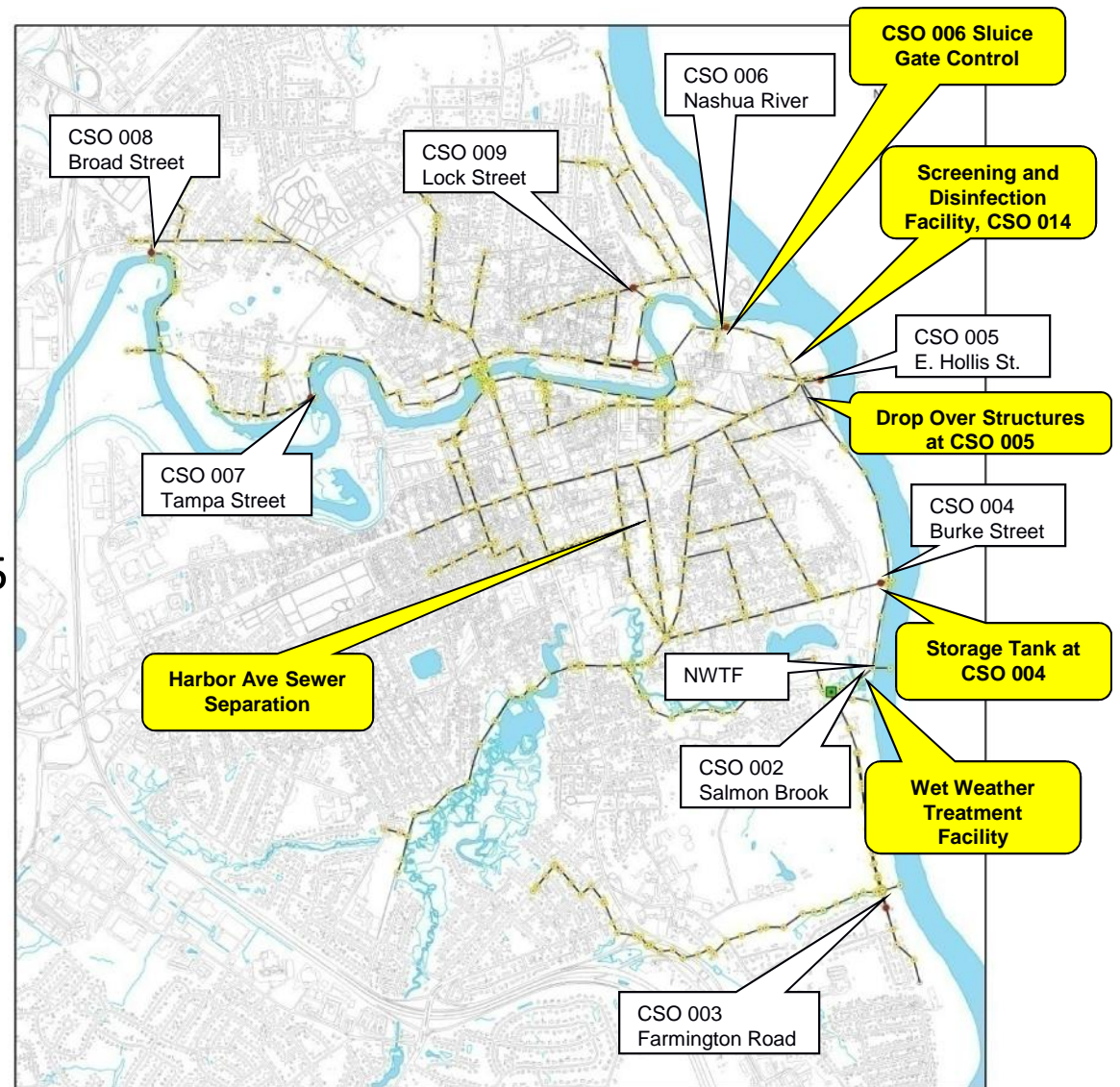
# CSO Program

Purpose : EPA required City to reduce Combined Sewer Overflows (CSOs) that are discharging to the Nashua and Merrimack Rivers

| Project   | Total Cost in \$ Million |
|---|--------------------------|
| <b>Completed (2005 to 2015)</b>                       |                          |
| Harbor Ave Sewer Separation                           | \$5.58                   |
| Wet Weather Flow (CSO) Treatment Facility 60 MGD      | \$32.38                  |
| System Optimization of CSO Regulators                 | \$1.81                   |
| Sluice Gate Control at CSO 006                        | \$0.90                   |
| Drop Over Structures at CSO 005                       | \$1.63                   |
| CSO 004 – 40,000 Gallon Storage Tank                  | \$1.70                   |
| Screening and Disinfection Facility 91 MGD            | \$15.16                  |
| <b>In Progress</b>                                    |                          |
| CSO 004 - Burke St Sewer Improvements                 | \$4.06                   |
| Infiltration/Inflow Removal                           | \$0.50                   |
| <b>Annual Expenditures</b> (Including future 6 years) |                          |
| Consent Decree Operational Expenditures               | \$1.36                   |
| • Post Construction Monitoring                        |                          |
| <b>Total</b>  | <b>\$65.23</b>           |

# CSO Projects Completed

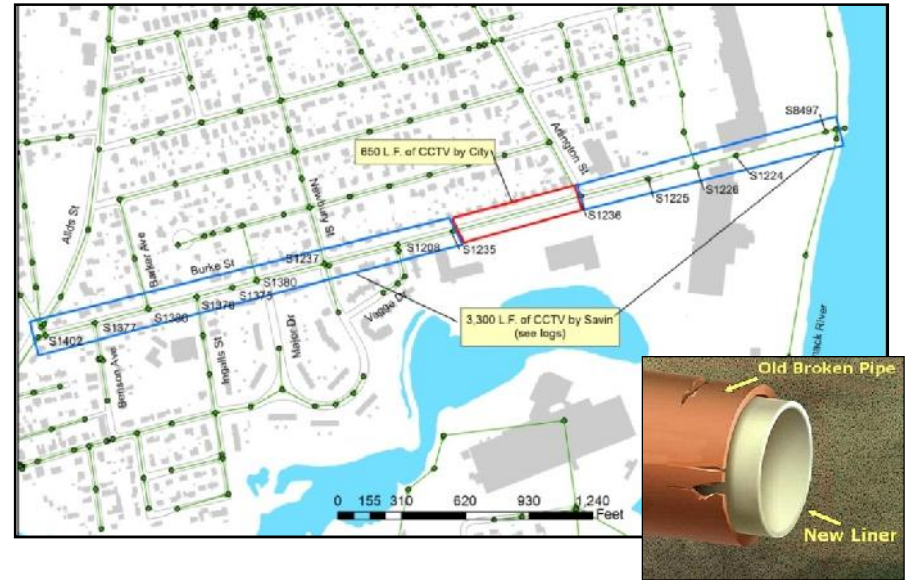
- Harbor Ave Sewer Separation
- Wet Weather Flow (CSO) Treatment Facility 60 MGD
- System Optimization of CSO Regulators
- Sluice Gate Control at CSO 006
- Drop Over Structures at CSO 005
- CSO 004 - 40,000 gal Storage Tank
- Screening and Disinfection Facility 91 MGD



# CSO Projects in Progress

## CSO 4 - Burke St Infrastructure

- Pipe lining of 24" sewer main, 3,640 feet long - completed
  - Manhole construction - completed
  - Service lines replacement, utility upgrades, street reconstruction
  - Final paving – Fall 2016
- Total Budget \$ 4.1 Mil



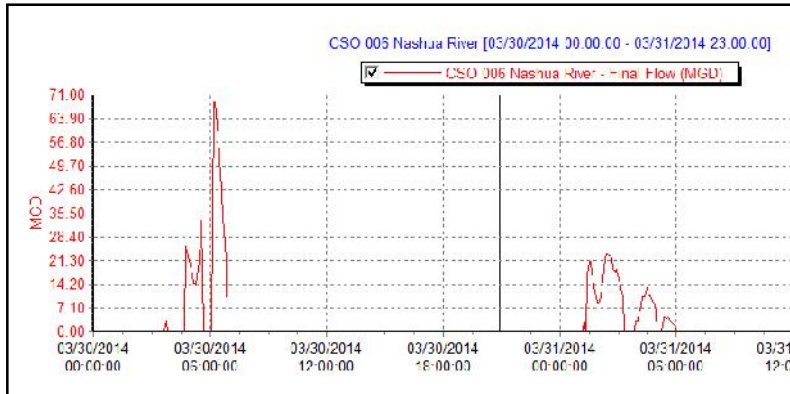
Epoxy lining of sewer manhole

## Inflow /Infiltration Removal

- (i) I/I Study currently undertaken (\$185,000)
- (ii) Anticipated recommendations
  - Sewer lining
  - Manhole lining and grouting
  - Sewer point repairs
  - Disconnect catch basins from sanitary sewer

Total Project Cost \$0.50 Mil

# CSO Operational Projects



CSO 6 Overflow Monitoring results

- Ongoing CSO flow monitoring
- High Flow Management at Treatment Facility
- Post Construction Monitoring for water quality



CSO 9 overflow



Confluence of the Nashua and Merrimack Rivers

# Collection Systems

| Project  | Total Cost in \$ Million |
|--|--------------------------|
| <b>Completed</b>   |                          |
| Annual Rehabilitation Projects past 5 years, approximate | \$9.4                    |
| <b>In Progress</b>                                       |                          |
| Pump Stations Rehabilitation                             | \$8.40                   |
| Merrimack River Flood Control                            |                          |
| - Rehabilitation   | \$0.15                   |
| - Overflow Detention Basin, Bridge St                    | \$2.57                   |
| Capacity Management O&M (CMOM) Plan                      | \$0.30                   |
| <b>Annual Expenditures</b>                               |                          |
| Average Annual Sewer Rehabilitation                      | \$1.32/yr                |
| Sewer Structure Replacement                              | \$0.23/yr                |
| Combined Sewage Flooding                                 | \$0.40/yr                |
| Stormwater Abatement                                     | \$0.18/yr                |

# Pump Stations Rehabilitation

- City operates 13 wastewater and one CSO pump stations
- Mechanical components and facility infrastructure
- Communication systems to transmit to treatment plant



Northgate Pump Station

# Merrimack River Flood Control System

Levee Deficiencies – Overgrown trees, erosion, drainage, encroachment, slide gate inoperable

CSO 5 Pump Station Upgrades

Emergency Overflow Basin – Raw sewage discharge near Renaissance development. May need to be eliminated.



# Capacity Management Operation and Maintenance (CMOM) Plan and Implementation

For Wastewater and Drainage Collection Systems

(I) Plan Ongoing - Expected completion February 2017

(II) Implementation of Recommendations

Cleaning

Video Inspection

Condition Assessment

Replacement

Rehabilitation

Staffing and Equipment

Asset Management Software - Cartegraph

# Annual Sewer Rehabilitation

| Year         | Budget                            |
|--------------|-----------------------------------|
| 2017         | \$3.10 Mil                        |
| 2018 to 2022 | \$1.61 Mil increasing 5% per year |

- Focuses on very old, unreinforced concrete pipes and areas with sinkholes
- Coordinates with Annual Paving Program and utilities
- CMOM Plan will include recommendations on implementing a more comprehensive sewer rehabilitation program



## Sewer Structure Replacement

- Replaces triangular covers and frames with round ones that meet OSHA standards
- Replaces deteriorated and/or obsolete catch basin frames and grates
- Replaces or repairs vertical structures as needed
- Annual Cost \$ 268,000, increases 5%/year
- In conjunction with street paving and with sewer rehabilitation projects



## Combined Sewage Flooding

- Low lying areas that remain problematic
- Issues with combined sewage surcharging during heavy rain events, basement back-ups, and street flooding
- Problem areas - Park Ave/Lawndale Ave area; Courtland St/Hall Ave area; C, D, E Sts; Marshall St (Bowers to East Hollis), Spaulding Ave.
- Annual Funding \$400,000



# Stormwater Abatement

- Address locations that have drainage issues during rain events
- Demonstration projects that promote water quality and infiltration as required by the EPA
- Projects include porous pavement, rain gardens, stormwater treatment units, drainage swales, etc.
- Annual funding \$197,000 increases 5% per yr

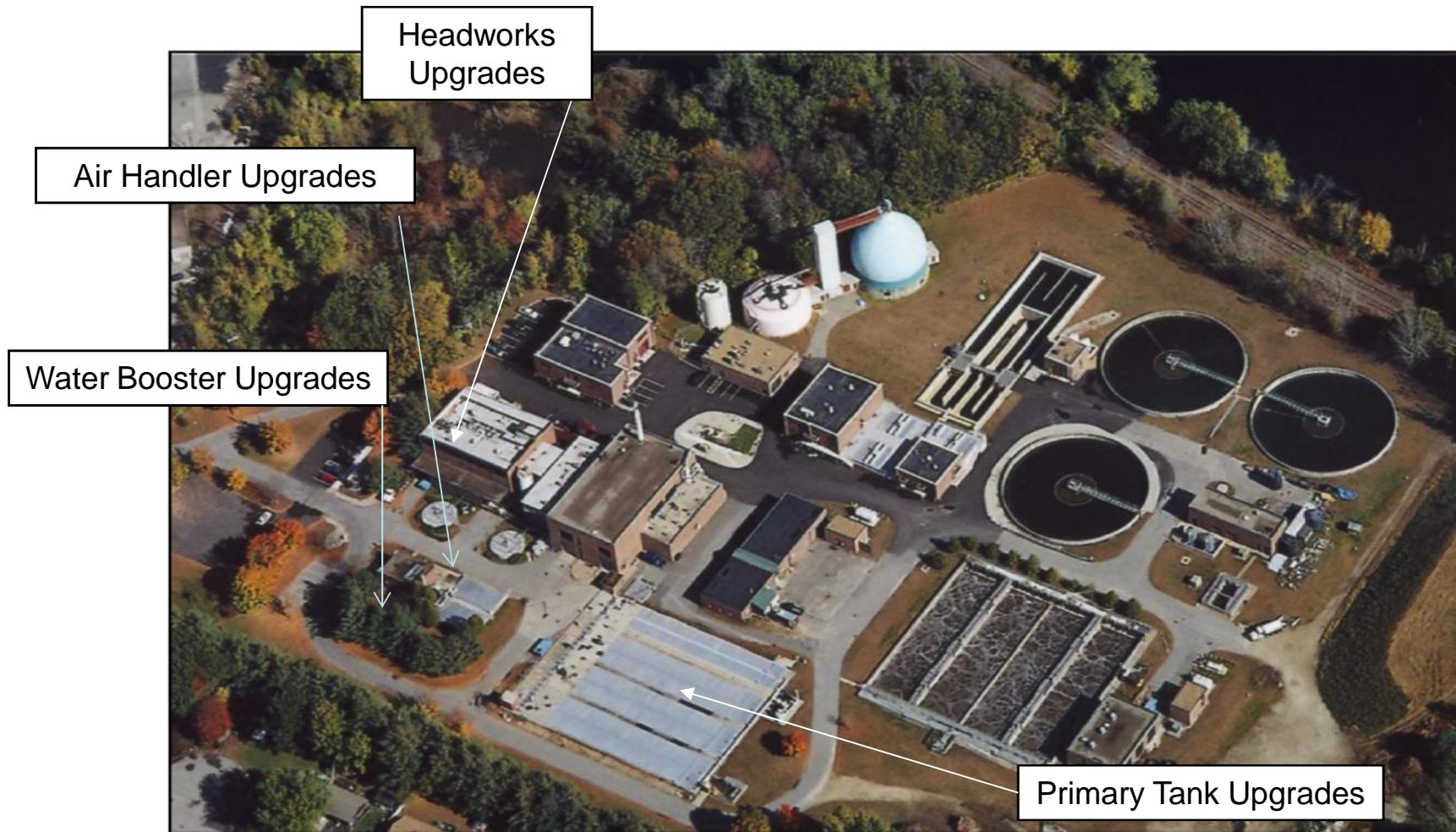


# Wastewater Treatment Facility

| Project  | Total Cost in \$ Million |
|--|--------------------------|
| <b>Completed</b>                                       |                          |
| Aeration Blowers/Tank and Secondary Clarifier Upgrades | \$4.16                   |
| Dewatering Equipment Replacement                       | \$5.57                   |
| Net Metering   | \$0.50                   |
| <b>In Progress</b>                                     |                          |
| Plant Headworks Upgrade                                | \$3.80                   |
| Effluent Defoamant Chemical Building                   | \$0.57                   |
| Primary Tank Upgrades                                  | \$4.20                   |
| Wastewater Plant Water Booster Station                 | \$0.78                   |
| AC & Air Handling Units                                | \$0.35                   |
| Phosphorus Removal & Storage Facility                  | \$0.86                   |
| SCADA Upgrades (WERF funds)                            | \$.088                   |

# Wastewater Treatment Facility Overview

## Upcoming Plant Projects



# Headworks Upgrades

Construction will begin November 2016

- Install new rake arms and screens
- Debris collected in incoming wastewater flow will be conveyed directly to dumpster at ground level – eliminates having to haul debris from intermediate level to ground level
- Replace overhead hoist
- Ventilation Upgrades
- Reconfigure hallway and relocate women's locker room to new location



Existing Grit Washer with Minors Cart –  
to be replaced & cart eliminated

# Capital Equipment Replacement Expenditures

- \$5,510,000 cost over next six years

| Nashua Wastewater Treatment Facility               |               |                         |   |                           |                |                          |                              |                               |                        |                        |
|--|---------------|-------------------------|---|---------------------------|----------------|--------------------------|------------------------------|-------------------------------|------------------------|------------------------|
| Schedule D - Wastewater Equipment Replacement Fund |               |                         |   |                           |                |                          |                              |                               |                        |                        |
| As of 5/4/2016                                     |               |                         |   |                           |                |                          |                              |                               |                        |                        |
|  | Major Systems | Major System Facilities | Asset Name  | Collections or Operations | Date Installed | Estimated Effective Life | RENEWAL/REPLACEMENT STRATEGY |                               |                        | ANNUAL RESERVE PAYMENT |
|  |               |                         |   |                           |                |                          | Cost of Renewal Option       | Recommended Renewal Date (FY) | Future Cost of Renewal |                        |
|  |               |                         |   |                           |                |                          | \$                           | Calibrated Column             |                        |                        |
|  |               |                         |   |                           |                |                          | Estimate                     | Calculated                    | 2.00%                  |                        |
|  |               |                         |   |                           | year           | years                    |                              |                               |                        |                        |
|  |               |                         |   |                           |                | Tab A-1                  |                              |                               |                        |                        |
| 1  | HW            | Eqpt                    | Mechanical Bar Screen No. 1                               | Operations                | 1999           | 21                       | \$ 108,000                   | 2016                          | \$ 110,160             | \$ 6,200               |
| 2  | HW            | Eqpt                    | Mechanical Bar Screen No. 2                               | Operations                | 1999           | 21                       | \$ 108,000                   | 2016                          | \$ 110,160             | \$ 6,200               |
| 3  | HW            | Eqpt                    | Screenings Wash Press No. 1                               | Operations                | 1999           | 21                       | \$ 91,800                    | 2016                          | \$ 93,636              | \$ 5,300               |
| 4  | HW            | Eqpt                    | Screenings Wash Press No. 2                               | Operations                | 1999           | 21                       | \$ 91,800                    | 2016                          | \$ 93,636              | \$ 5,300               |
| 5  | HW            | Eqpt                    | Screenings Roll-Off Container No. 1                       | Operations                | 1999           | 21                       | \$ 33,000                    | 2016                          | \$ 33,660              | \$ 1,900               |
| 6  | HW            | Eqpt                    | Screenings Roll-Off Container No. 2                       | Operations                | 1999           | 21                       | \$ 33,000                    | 2016                          | \$ 33,660              | \$ 1,900               |
| 7  | HW            | Eqpt                    | Screenings Roll-Off Winch                                 | Operations                | 1999           | 21                       | \$ 23,625                    | 2016                          | \$ 24,098              | \$ 1,400               |
| 8  | HW            | G/A                     | Influent WWTF Sluice Gate                                 | Operations                | 1972           | 53                       | \$ 162,000                   | 2024                          | \$ 193,605             | \$ 3,300               |
| 9  | HW            | G/A                     | HW-SLG-1 Hydraulic Power Plant Actuator                   | Operations                | 1999           | 20                       | \$ 114,750                   | 2018                          | \$ 121,774             | \$ 6,100               |
| 10   | HW            | G/A                     | Influent SCR Slide Gate No. 1                             | Operations                | 1972           | 53                       | \$ 27,000                    | 2024                          | \$ 32,267              | \$ 500                 |
| 11   | HW            | G/A                     | HW-SLD-1 Electric Actuator                                | Operations                | 1999           | 35                       | \$ 7,425                     | 2036                          | \$ 11,254              | \$ 300                 |
| 12   | HW            | G/A                     | Influent SCR Slide Gate No. 2                             | Operations                | 1972           | 53                       | \$ 27,000                    | 2024                          | \$ 32,267              | \$ 500                 |
| 13   | HW            | G/A                     | HW-SLD-2 Electric Actuator                                | Operations                | 1999           | 35                       | \$ 7,425                     | 2036                          | \$ 11,254              | \$ 300                 |
| 14   | HW            | G/A                     | Effluent SCR Slide Gate No. 1                             | Operations                | 1972           | 53                       | \$ 27,000                    | 2024                          | \$ 32,267              | \$ 500                 |
| 15   | HW            | G/A                     | Effluent SCR Slide Gate No. 2                             | Operations                | 1972           | 53                       | \$ 27,000                    | 2024                          | \$ 32,267              | \$ 500                 |
| 16   | HW            | G/A                     | Wet Well XC Sluice Gate                                   | Operations                | 1972           | 53                       | \$ 27,000                    | 2024                          | \$ 32,267              | \$ 500                 |
| 17   | HW            | G/A                     | HW-SLG-2 Electric Actuator                                | Operations                | 1999           | 35                       | \$ 7,425                     | 2036                          | \$ 11,254              | \$ 300                 |
| 18   | RSPS          | Eqpt                    | Bridge Crane No. 1 (3-Ton)                                | Operations                | 1972           | 50                       | \$ 135,000                   | 2022                          | \$ 155,073             | \$ 2,700               |
| 19   | RSPS          | Eqpt                    | Monorail System No. 1 (3-Ton) (part of Headworks project) | Operations                | 1972           | 41                       | \$ 67,500                    | 2016                          | \$ 68,850              | \$ 1,400               |
| 20   | RSPS          | Instr                   | Influent Magnetic Flow Meter                              | Operations                | 1995           | 35                       | \$ 20,250                    | 2031                          | \$ 27,799              | \$ 700                 |
| 21   | RSPS          | MCC                     | MCC-101   | Operations                | 1999           | 40                       | \$ 162,000                   | 2041                          | \$ 271,094             | \$ 5,800               |
| 22   | RSPS          | MCC                     | MCC-Headworks   | Operations                | 1999           | 40                       | \$ 108,000                   | 2040                          | \$ 177,185             | \$ 3,900               |
| 23   | RSPS          | MCC                     | MCC-1A  | Operations                | 1998           | 40                       | \$ 81,000                    | 2039                          | \$ 130,283             | \$ 2,900               |
| 24   | RSPS          | MCC                     | MCC-1B  | Operations                | 1998           | 40                       | \$ 81,000                    | 2039                          | \$ 130,283             | \$ 2,900               |
| 25   | RSPS          | Pump                    | Raw Sewage Pump No. 1                                     | Operations                | 2012           | 40                       | \$ 229,500                   | 2054                          | \$ 496,809             | \$ 10,700              |
| 26   | RSPS          | Pump                    | Raw Sewage Pump No. 2                                     | Operations                | 2016           | 40                       | \$ 120,000                   | 2057                          | \$ 270,264             | \$ 6,000               |
| 27   | RSPS          | Pump                    | Raw Sewage Pump No. 3                                     | Operations                | 2016           | 40                       | \$ 120,000                   | 2057                          | \$ 270,264             | \$ 6,000               |
| 28   | RSPS          | Pump                    | Raw Sewage Pump No. 4                                     | Operations                | 2013           | 40                       | \$ 229,500                   | 2055                          | \$ 506,745             | \$ 10,900              |
| 29   | RSPS          | Pump                    | Sump Pump No. 1   | Operations                | 2015           | 15                       | \$ 27,000                    | 2031                          | \$ 37,065              | \$ 2,200               |
| 30   | TPS           | Eqpt                    | Thickened Primary Sludge Grinder No. 1                    | Operations                | 1989           | 40                       | \$ 16,200                    | 2031                          | \$ 22,239              | \$ 500                 |
| 31   | TPS           | Eqpt                    | Thickened Primary Sludge Grinder No. 2                    | Operations                | 1989           | 40                       | \$ 16,200                    | 2031                          | \$ 22,239              | \$ 500                 |
| 32   | TPS           | Eqpt                    | Thickened Primary Sludge Grinder No. 3                    | Operations                | 1989           | 40                       | \$ 16,200                    | 2031                          | \$ 22,239              | \$ 500                 |
| 33   | TPS           | Eqpt                    | Primary Thickener Drive Mechanism No. 1                   | Operations                | 2014           | 40                       | \$ 89,000                    | 2056                          | \$ 204,455             | \$ 4,400               |
| 34   | TPS           | Eqpt                    | Primary Thickener Drive Mechanism No. 2                   | Operations                | 2014           | 40                       | \$ 89,000                    | 2056                          | \$ 204,455             | \$ 4,400               |
| 35   | TPS           | Eqpt                    | Primary Thickener Structure No. 1                         | Operations                | 1972           | 53                       | \$ 47,250                    | 2028                          | \$ 61,123              | \$ 900                 |
| 36   | TPS           | Eqpt                    | Primary Thickener Structure No. 2                         | Operations                | 1972           | 53                       | \$ 47,250                    | 2028                          | \$ 61,123              | \$ 900                 |
| 37   | TPS           | HVAC                    | Dry Well Supply Fan                                       | Operations                | 1999           | 40                       | \$ 24,300                    | 2042                          | \$ 41,477              | \$ 900                 |
| 38   | TPS           | HVAC                    | Wet Well Supply Fan                                       | Operations                | 1999           | 40                       | \$ 24,300                    | 2042                          | \$ 41,477              | \$ 900                 |
| 39   | TPS           | HVAC                    | Dry Well Exhaust Fan                                      | Operations                | 1999           | 40                       | \$ 6,750                     | 2042                          | \$ 11,521              | \$ 200                 |
| 40   | TPS           | HVAC                    | Wet Well Exhaust Fan                                      | Operations                | 1999           | 40                       | \$ 27,000                    | 2042                          | \$ 46,086              | \$ 1,000               |
| 41   | TPS           | HVAC                    | Primary Thickener OCS No. 1                               | Operations                | 2005           | 20                       | \$ 40,500                    | 2024                          | \$ 48,401              | \$ 2,400               |